



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/820,079

04/06/2004

Tatsuya Shindo

501558.20016

7098

26418

7590

09/29/2006

REED SMITH, LLP

ATTN: PATENT RECORDS DEPARTMENT
599 LEXINGTON AVENUE, 29TH FLOOR
NEW YORK, NY 10022-7650

EXAMINER

FIDLER, SHELBY LEE

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 09/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/820,079	SHINDO, TATSUYA	
	Examiner	Art Unit	
	Shelby Fidler	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12, 13, 15, 16, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 11, 14, 17 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 1, 12, 16, and 19 are objected to as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims state that, in the second mode, ink ejecting actions are performed continuously without the non-ejection pause, which is unclear since there is no frame of reference in the claim to determine the duration of the continuous flushing cycle; therefore, the second mode as claimed ejects ink forever. Please incorporate a frame of reference for the duration of the flushing mode, such as "said ink ejecting actions are performed continuously within a flushing cycle."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotoh et al. (US 6527361 B1).

Regarding claim 1:

Gotoh et al. discloses an ink jet printing apparatus comprising:

Art Unit: 2861

an ink jet head (*recording heads 1; Fig. 7*) including an ink ejecting portion (*nozzle section 11; Fig. 8*) and an ejection-energy generating portion (*heat generators 22*) operable to eject droplets of an ink from the ink ejecting portion (*col. 6, lines 34-36 with col. 1, lines 53-57*);

a purging device (*suction cap 202; Fig. 2*) operable to discharge the ink from the ink ejecting portion (*col. 8, lines 20-25*), without an operation of the ejection-energy generating portion (*performed by pump 201; col. 8, lines 20-23*), for thereby performing a purging operation to improve an ink ejecting state of the ink jet head (*col. 8, lines 40-47*);

a controller (*electric circuit; col. 6, lines 46-48*) operable to control the purging device for performing the purging operation (*e.g. step S13 of Fig. 14*), and to control the ejection-energy generating portion for performing a flushing operation to discharge the ink from the ink ejecting portion to improve the ink ejecting state of the ink jet head (*e.g. step S16 of Fig. 14*),

and wherein the controller includes a flushing control portion (*recovery control means, col. 4, lines 15-17*) operable to control the ejection-energy generating portion in a first modes (*e.g. the preliminary ejection modes of steps S25 in Fig. 15*), wherein a first mode (*e.g. the mode of Fig. 22B*) performs ink ejecting actions in the flushing operation in a plurality of intermittent cycles (*elements 3 in Fig. 19B*), with a non-ejection pause (*interruption period*) being inserted between two successive ones of the intermittent cycles (*col. 14, lines 44-46 and Fig. 19B*), the non-ejection pause having a time duration longer than a period of each of the ink ejecting actions (*e.g. Fig. 22B shows an interruption period longer than a discharge process*), and a second mode (*e.g. the mode of Fig. 22C*); and

another mode in which the ink ejecting actions are performed continuously without the non-ejection pause (*col. 14, lines 28-30 and Fig. 19A*).

Gotoh et al. do not expressly disclose that the second mode is the mode in which the ink ejecting actions are performed continuously without the non-ejection pause.

However, at the time of invention, it would have been obvious to a person of ordinary skill in the art to switch to a flushing mode in which ejections are performed continuously without the non-ejection pause using the mode-switching controller of Gotoh et al. The motivation for doing so, as taught by Gotoh et al., is to completely drain the mixed ink in the nozzle that had appeared from the preceding suction operation (*col. 2, lines 30-41*).

Regarding claim 2:

Gotoh et al. also disclose that the time duration of the non-ejection pause is long enough to permit air bubbles in the ink in the ink jet head to be substantially dissolved in the ink (*e.g. Fig. 22C shows a duration of about 1 second*).

Regarding claim 3:

Gotoh et al. also disclose that the flushing control portion controls the ejection-energy generating portion such that the ink ejecting actions in each of the plurality of intermittent cycles are effected at a frequency of 4-10 kHz (*6 kHz, col. 13, lines 39-41*).

Regarding claims 4 and 5:

Gotoh et al. also disclose that time duration of the non-ejection pause is about one second (*Fig. 22B shows a duration of about 1 second; col. 15, lines 1-6 show that the duration changes depending on the types of inks*).

Regarding claim 6:

Gotoh et al. also disclose that the flushing control portion activates the ejection-energy generating portion to perform the flushing operation (*step S16*) after termination of the purging operation (*step S15*) by the purging device (*flowchart of Figure 14*).

Art Unit: 2861

Regarding claim 7:

Gotoh et al. also disclose that each of the plurality of intermittent cycles includes the ink ejecting actions performed for a length of time during which air bubbles in the ink in the ink jet head do not grow to sizes so large as to disturb a normal ink ejecting operation of the ink jet head (*since this limitation lacks any structural recitation, it has not been given patentable weight; however, note that Figs. 22 of Gotoh et al. shows ejecting durations of about 1 second*).

Regarding claim 8:

Gotoh et al. also disclose that the flushing control portion includes a timer operable to measure the time duration of the non-ejection pause (*col. 14, lines 44-46 shows that there is a predetermined pause. Since the pause was predetermined, it is inherent that Gotoh et al.'s invention incorporated a timer to ensure the duration of the predetermined pause*).

Regarding claim 9:

Gotoh et al. also disclose that the flushing control portion is operable to control the ejection-energy generating portion such that each of the plurality of intermittent cycles includes a predetermined number of the ink ejecting actions (*col. 12, lines 61-64 with col. 13, lines 39-41 shows that the time of a cycle, and thus number of ejections, is predetermined*).

Regarding claim 10:

Gotoh et al. also disclose that the flushing control portion is operable to control the ejection-energy generating portion such that the ink ejecting actions in each of the plurality of intermittent cycles are performed for a predetermined time duration (*col. 12, lines 61-64*).

Regarding claim 12:

Gotoh et al. disclose an ink jet printing apparatus comprising:

Art Unit: 2861

a head unit (*carriage 2; Fig. 7*) having a plurality of ink jet heads (*recording heads 1; Fig. 7*) each including an ink ejecting portion (*nozzle section 11, Fig. 8*) and an ejection-energy generating portion (*heat generators 22*) operable to eject droplets of an ink from the ink ejecting portion (*col. 6, lines 34-36 with col. 1, lines 53-57*);

a purging device (*suction cap 202; Fig. 2*) operable to discharge the ink from the ink ejecting portions of two adjacent ones of the plurality of ink jet heads (*col. 8, lines 20-25*), without operations of the ejection-energy generating portions of the two adjacent ink jet heads (*performed by pump 201; col. 8, lines 20-23*), for thereby performing a purging operation to improve ink ejecting states of the two adjacent ink jet heads (*col. 8, lines 40-47*); and

a controller (*electric circuit; col. 6, lines 46-48*) operable to control the purging device for performing the purging operation (*e.g. step S13 of Fig. 14*), and to control the ejection-energy generating portion for performing a flushing operation to discharge the ink from the ink ejecting portion of each of the two adjacent ink jet heads to improve the ink ejecting states of the two adjacent ink jet heads (*e.g. step S16 of Fig. 14 and Fig. 15*),

and wherein the controller includes a flushing control portion (*recovery control means, col. 4, lines 15-17*) operable to control the ejection-energy generating portion of each of the two adjacent ink jet heads such that ink ejecting actions in the flushing operation are performed in a plurality of intermittent cycles (*elements 3 in Fig. 19B*), with a non-ejection pause (*interruption periods*) being inserted between two successive ones of the intermittent cycles (*col. 14, lines 44-46*), the non-ejection pause having a time duration longer than a period of each of the ink ejecting actions (*e.g. Fig. 22B shows an interruption period longer than a discharge process*).

Regarding claim 13:

Gotoh et al. also disclose that the purging device includes a suction cap (*suction cap 202; Fig. 2*) arranged for a pressure-tight contact with the ink ejecting portions of the two adjacent ink jet heads (*col. 8, lines 42-47*).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15, 16, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotoh et al. in view of Lin et al. (US 6701593 B2).

Regarding claim 15 and 16:

Gotoh et al. disclose all limitations of claim 1 that also apply to claims 15 and 16.

Gotoh et al. do not expressly disclose that the ink jet head is of piezoelectric type having a plurality of chambers, a plurality of ejection nozzles and a piezoelectric actuator operable to pressurize ink in selected ink chambers for ejecting droplets of ink from the corresponding nozzles.

However, Lin et al. disclose using an ink jet head that is of piezoelectric type having a plurality of chambers (ink chambers 27), a plurality of ejection nozzles (ink ports 28) and a piezoelectric actuator (piezoelectric sheet 22 + electrodes 21; Fig. 6B) operable to pressurize ink in selected ink chambers for ejecting droplets of ink from the corresponding nozzles (*col. 1, lines 30-31*).

Art Unit: 2861

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize piezoelectric type ink jet heads into the invention of Gotoh et al. The motivation for doing so, as taught by Lin et al., is that piezoelectric heads do not incur the chemical reaction that occurs because of high temperatures, keeping the color of printed material from being adversely effected (col. 1, lines 30-42).

Regarding claims 18 and 19:

Gotoh et al. disclose all limitations of claim 12 that also apply to claims 18 and 19.

Gotoh et al. do not expressly disclose that the ink jet heads are of piezoelectric type having a plurality of chambers, a plurality of ejection nozzles and a piezoelectric actuator operable to pressurize ink in selected ink chambers for ejecting droplets of ink from the corresponding nozzles.

However, Lin et al. disclose using an ink jet head that is of piezoelectric type having a plurality of chambers (ink chambers 27), a plurality of ejection nozzles (ink ports 28) and a piezoelectric actuator (piezoelectric sheet 22 + electrodes 21; Fig. 6B) operable to pressurize ink in selected ink chambers for ejecting droplets of ink from the corresponding nozzles (col. 1, lines 30-31).

Allowable Subject Matter

Claims 11, 14, 17, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 11 contains allowable subject matter since the prior art of record does not teach an ink jet printing apparatus comprising a flushing control portion that is operable in the first

Art Unit: 2861

mode after the time measured by the time measuring portion has reached a predetermined threshold, and in the second mode before the time has reached the predetermined threshold in combination with other features and limitations of claim 11.

Claims 14, 17, and 20 contain allowable subject matter for the same reasons as applied to claim 11.

Response to Arguments

Applicant's arguments with respect to claims 1 and 12 have been considered but are moot in view of the new ground(s) of rejection. Please see the above rejection of Gotoh et al. which discloses a flushing control portion operable to control ejection in a first mode in which ink ejecting actions are performed in a plurality of intermittent cycles, and a second mode in which ink ejecting actions are performed continuously without the non-ejection pause.

In response to applicant's argument that Gotoh et al. is not interested in solving the problem of growth in air bubbles in the ink as a result of a continuous flushing operation, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2861

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 2861

Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelby Fidler whose telephone number is (571) 272-8455. The examiner can normally be reached on MWF 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

 9/22/06

Shelby Fidler
Patent Examiner
AU 2861



Vip Patel
Supervisory Examiner
AU 2861